CLAIMS

1. A method of forming a metal section on a metal substrate by depositing a plurality of superimposed layers using a laser generating a heating beam and a powdered metal source operative to feed metal powder into the beam and moving the substrate relative to the beam under numerical control over a programmed path to provide an advancing melt pool, comprising: sensing parameters of the melt pool at a plurality of selected coordinates during the generation of a plurality of metallic layers, storing the sensed parameters of the pool at each of the selected coordinates, and processing the stored parameters to determine an appropriate laser power for use during the deposition of a subsequent layer.

2. The method of claim 1 wherein processing the stored parameters comprises comparing a matrix of the sensed parameters stored during formation of the last layer deposited with the matrix of the sensed parameters of an earlier deposited layer to determine an appropriate laser power for use during the deposition of the next layer.

3. The method of claim 2 wherein the earlier deposited layer constitutes the second layer deposited over the substrate.

4. The method of claim 1 wherein the sensed parameters of the pool comprise the dimensions of the pool.

5. The method of claim 1 wherein the sensed parameters of the pool comprise the optical intensity of the pool.

6. The method of claim 1 wherein the sensed parameters of the pool comprise the dimensions of the pool and the optical intensity of the pool.

7. The method of claim 1 wherein the sensed parameters of the melt pool comprise the temperature of the melt pool.

8. A method of forming a metal section on a metal substrate by depositing a plurality of superimposed layers by using a power source generating a heating beam and a metal source operative to feed metal powder into the beam and moving the substrate relative to the beam over the section to provide an advancing melting pool, comprising sensing parameters of the melt pool at a plurality of selected coordinates during the generation of a plurality of metallic layers, storing the sensed parameters of the pool at each of the coordinates, and processing the stored parameters to determine an appropriate laser power for use during deposition of a subsequent layer.

9. The method of claim 8 wherein the power source is a laser.

10. The method of claim 8 wherein the power source is an electron beam.

11. The method of claim 8 wherein the power beam level is maintained at a constant during generation of each layer.

12. A method of forming a metal section on a metal substrate by depositing a plurality of superimposed layers using a heating beam and a powdered metal source operative to feed metal powder into the beam and moving the substrate relative to the beam under numerical control over a programmed path to provide an advancing melting pool, comprising:

depositing a first layer in contact with the substrate using a first heating beam power;

depositing a second layer over the first layer using the same heating beam power as used in the first layer and sensing parameters of the melt pool at a plurality of selected coordinates during the generation of said second layer;

depositing a third layer using the same heating beam power as employed in the first two layers and sensing parameters of the melt pool at said selected coordinates during generation of the third layer; and

using the stored parameters of the melt pool during generation of the second and third layers to determine an appropriate heating beam power for use during deposition of subsequent layers.

13. The method of claim 12 where as each subsequent layer is deposited, the parameters of the melt pool are sensed at said plurality of selected coordinates and are used, along with previously stored sensed parameters, to determine the heating beam power for subsequent layers.